

1 **CLAIMS**

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3 1. A method for designing an application programming interface (API),  
4 the method comprising:

5 preparing a plurality of code samples for a core scenario, each respective  
6 code sample of the plurality of code samples corresponding to a respective  
7 programming language of a plurality of programming languages; and

8 deriving the API from the core scenario responsive to the plurality of code  
9 samples.

10  
11 2. The method as recited in claim 1, further comprising:  
12 determining, by an API designer, if the derived API is too complex.

13  
14 3. The method as recited in claim 2, further comprising:  
15 if the derived API is determined to be too complex, then  
16 refining, by the API designer, the derived API to produce a refined  
17 API.

18  
19 4. The method as recited in claim 3, further comprising:  
20 determining, by the API designer, if the refined API is too complex.

21  
22 5. The method as recited in claim 1, further comprising:  
23 performing one or more usability studies on the API utilizing a plurality of  
24 developers.

1           **6.**     The method as recited in claim 5, wherein the performing comprises:  
2                     performing the one or more usability studies on the API utilizing the  
3           plurality of developers wherein the plurality of developers are typical for  
4           the plurality of programming languages.

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6           **7.**     The method as recited in claim 5, further comprising:  
7                     ascertaining whether the plurality of developers are able to use the API  
8           without significant problems.

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10          **8.**     The method as recited in claim 7, further comprising:  
11                     if the plurality of developers are not ascertained to be able to use the API  
12           without significant problems, then revising the API.

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14          **9.**     The method as recited in claim 8, wherein the revising comprises:  
15                     revising the API based on at least one lesson from the one or more  
16           usability studies.

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18          **10.**    The method as recited in claim 1, wherein the deriving comprises:  
19                     deriving the API to support the plurality of code samples that  
20           correspond respectively to the plurality of programming languages.

1       **11.**     The method as recited in claim 1, wherein the deriving comprises:  
2               gleaning language-specific mandates from the plurality of code  
3 samples; and  
4               incorporating the language-specific mandates into the API.  
5

6       **12.**     The method as recited in claim 1, wherein the deriving comprises:  
7               gleaning language-inspired developer expectations from the plurality  
8 of code samples; and  
9               incorporating the language-inspired developer expectations into the  
10 API.  
11

12       **13.**     The method as recited in claim 1, wherein the deriving comprises:  
13               gleaning commonalities from the plurality of code samples; and  
14               incorporating the commonalities into the API.  
15

16       **14.**     The method as recited in claim 1, wherein the deriving comprises:  
17               deriving the API to have an aggregate component that ties a plurality  
18 of lower-level factored types together to support the core scenario.  
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1           **15.**    A method for designing an application programming interface  
2 (API), the method comprising:  
3           selecting a core scenario for a feature area;  
4           writing at least one code sample for the core scenario; and  
5           deriving an API for the core scenario responsive to the at least one code  
6 sample.

7  
8           **16.**    The method as recited in claim 15, wherein the selecting comprises:  
9           selecting a plurality of core scenarios for the feature area.  
10

11           **17.**    The method as recited in claim 16, further comprising:  
12           repeating the writing and the deriving for each core scenario of the plurality  
13 of core scenarios that are selected for the feature area.  
14

15           **18.**    The method as recited in claim 15, wherein the writing comprises:  
16           writing a plurality of code samples for the core scenario, each  
17           respective code sample of the plurality of code samples corresponding to a  
18           respective programming language of a plurality of programming languages.  
19

20           **19.**    The method as recited in claim 18, wherein the deriving comprises:  
21           deriving the API for the core scenario responsive to the plurality of  
22 code samples.  
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1           **20.**     The method as recited in claim 15, further comprising:  
2           performing one or more usability studies on the API utilizing a plurality of  
3 developers;  
4           ascertaining whether the plurality of developers are able to use the API  
5 without significant problems; and  
6           if the plurality of developers are not ascertained to be able to use the API  
7 without significant problems, then revising the API.

8  
9           **21.**     The method as recited in claim 20, wherein the revising comprises:  
10           revising the API based on at least one lesson from the one or more  
11 usability studies to produce a revised API.

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13           **22.**     The method as recited in claim 21, further comprising:  
14 repeating the performing and the ascertaining with respect to the revised  
15 API.

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17           **23.**     The method as recited in claim 15, wherein the deriving comprises:  
18           deriving the API to support the at least one code sample written for  
19 the core scenario by producing a two-layer API that includes an aggregate  
20 component and a plurality of underlying factored types.

1       **24.**     The method as recited in claim 15, wherein the deriving comprises:  
2               gleaning one or more language-specific mandates from the at least  
3       one code sample; and  
4               incorporating the one or more language-specific mandates into the  
5       API.

6  
7       **25.**     The method as recited in claim 15, wherein the deriving comprises:  
8               encapsulating a particular factored type into an aggregate component  
9       that is associated with the core scenario if all members of the particular  
10      factored type are exposed by the aggregate component.

11  
12      **26.**     The method as recited in claim 15, wherein the deriving comprises:  
13              encapsulating a particular factored type into an aggregate component  
14      that is associated with the core scenario if the particular factored type is  
15      independently uninteresting to other component types.

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17      **27.**     The method as recited in claim 15, wherein the deriving comprises:  
18              exposing a particular factored type from an aggregate component  
19      that is associated with the core scenario if at least one member of the  
20      particular factored type is not exposed by the aggregate component.

1       **28.**     The method as recited in claim 15, wherein the deriving comprises:  
2               exposing a particular factored type from an aggregate component  
3       that is associated with the core scenario if the particular factored type can  
4       be beneficially used independently of the aggregate component by another  
5       component type.

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7       **29.**     The method as recited in claim 15, wherein the deriving comprises:  
8               producing a two-layer framework that includes component types  
9       targeting a relatively higher level of abstraction and component types  
10      targeting a relatively lower level of abstraction.

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12      **30.**     The method as recited in claim 29, wherein the component types  
13      targeting the relatively higher level of abstraction are directed to core scenarios.

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15      **31.**     The method as recited in claim 29, wherein the component types  
16      targeting the relatively lower level of abstraction provide a relatively greater  
17      amount of control to developers as compared to the component types targeting the  
18      relatively higher level of abstraction.

19  
20      **32.**     The method as recited in claim 15, wherein the deriving comprises:  
21               deriving the API so as to enable a developer to implement a create-  
22      set-call usage pattern for the core scenario.

1           **33.**    The method as recited in claim 32, wherein the deriving comprises:

2                           producing the API with pre-selected parameters that are  
3                           appropriate for the core scenario.

4  
5           **34.**    A method for designing an application programming interface  
6 (API), the method comprising:

7                           deriving an API for a scenario responsive to at least one code sample  
8 written with regard to the scenario;

9                           performing one or more usability studies on the API utilizing a plurality of  
10 developers; and

11                          revising the API based on the one or more usability studies.

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13          **35.**    The method as recited in claim 34, further comprising:

14                          writing a plurality of code samples with regard to the scenario, each  
15 respective code sample of the plurality of code samples corresponding to a  
16 respective programming language of a plurality of programming languages;

17                          wherein the deriving comprises:

18                                  deriving the API for the scenario responsive to the plurality of code  
19 samples.



1           **36.**     The method as recited in claim 34, further comprising, prior to the  
2 performing one or more usability studies on the API:

3                 determining, by an API designer, if the derived API is too complex;

4                 if the derived API is determined to be too complex, then

5                         refining, by the API designer, the derived API to produce a refined  
6 API; and

7                         determining, by the API designer, if the refined API is too complex.

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9           **37.**     The method as recited in claim 34, further comprising:

10                 ascertaining whether the plurality of developers are able to use the API  
11 without significant problems; and

12                 when the plurality of developers are not ascertained to be able to use the  
13 API without significant problems, then implementing the revising;

14                 wherein the revising comprises:

15                         revising the API based on at least one lesson from the one or more  
16 usability studies to produce a revised API.

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18           **38.**     The method as recited in claim 37, further comprising:

19                 repeating at least the performing and the ascertaining with respect to the  
20 revised API.

1           **39.**    The method as recited in claim 37, wherein the ascertaining  
2 comprises:

3                   ascertaining whether the plurality of developers are able to use the  
4 API without significant problems with regard to a desired level of usability  
5 for at least one targeted developer group, wherein the desired level of  
6 usability includes considerations with respect to (i) frequent and/or  
7 extensive reference to detailed API documentation by the plurality of  
8 developers, (ii) a failure of a majority of the plurality of developers to  
9 implement the scenario, and (iii) whether the plurality of developers take an  
10 approach that is significantly different from what is expected by an API  
11 designer.

12  
13           **40.**    The method as recited in claim 34, further comprising:  
14 selecting a plurality of core scenarios for a feature area;  
15 repeating the deriving, the performing, and the revising for each core  
16 scenario of the plurality of core scenarios.

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18           **41.**    The method as recited in claim 40, wherein the deriving comprises:  
19                   producing an aggregate component for each core scenario of the  
20 plurality of core scenarios.

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22           **42.**    The method as recited in claim 34, wherein the deriving comprises:  
23                   producing an aggregate component that has a respective relationship  
24 with each respective factored type of a plurality of factored types.  
25

1           **43.**   The method as recited in claim 42, wherein the producing  
2 comprises:

3                   producing the aggregate component to support the scenario  
4 for which the at least one code sample is written.  
5

6           **44.**   The method as recited in claim 42, wherein the producing  
7 comprises:

8                   producing the aggregate component to have an exposed  
9 relationship with at least one factored type of the plurality of  
10 factored types and an encapsulated relationship with at least one  
11 other factored type of the plurality of factored types.  
12

13           **45.**   The method as recited in claim 44, wherein the at least one other  
14 factored type of the plurality of factored types that has the encapsulated  
15 relationship with the aggregate component can be handed off by the aggregate  
16 component for direct interaction with another component type.  
17

18           **46.**   The method as recited in claim 42, wherein the plurality of factored  
19 types are designed using an object-oriented methodology.  
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1           **47.**    A method for designing an application programming interface  
2 (API), the method comprising:

3           preparing a plurality of code samples for a core scenario, each respective  
4 code sample of the plurality of code samples corresponding to a respective  
5 programming language of a plurality of programming languages;

6           deriving the API for the core scenario responsive to the plurality of code  
7 samples;

8           performing one or more usability studies on the API utilizing a plurality of  
9 developers; and

10          revising the API based on the one or more usability studies.

11  
12           **48.**    A method for designing an application programming interface  
13 (API), the method comprising:

14          writing at least one code sample for a scenario; and

15          deriving an API for the scenario responsive to the at least one code sample,  
16 the API including (i) an aggregate component that is adapted to facilitate  
17 implementation of the scenario and (ii) a plurality of factored types that provide  
18 underlying functionality for the aggregate component, the API enabling a gradual  
19 progression from using the aggregate component in simpler situations to using an  
20 increasing portion of the plurality of factored types in increasingly complex  
21 situations.

1       **49.**    A method for designing an application programming interface  
2 (API), the method comprising:

3       deriving at least one aggregate component to support at least one code  
4 sample for at least one scenario;

5       determining additional requirements with respect to the at least one  
6 scenario;

7       deciding if the additional requirements can be added to the at least one  
8 aggregate component without adding undue complexity to the at least one  
9 scenario; and

10      if not, defining a plurality of factored types responsive to the deciding.

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12      **50.**    The method as recited in claim 49, further comprising:

13      if so, refining the at least one aggregate component to incorporate the  
14 additional requirements.

1           **51.**     The method as recited in claim 49, further comprising:  
2           selecting a plurality of core scenarios for a feature area, the plurality of core  
3           scenarios including the at least one scenario; and  
4           writing a plurality of code samples showing preferred lines of code for the  
5           plurality of core scenarios, the plurality of code samples including the at least one  
6           code sample;  
7           wherein the deriving comprises:  
8                 deriving a plurality of aggregate components, which include the at  
9           least one aggregate component, to support the plurality of code samples for  
10          the plurality of core scenarios.

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12          **52.**     The method as recited in claim 49, wherein the deriving comprises:  
13                 deriving the at least one aggregate component with appropriate  
14           methods, defaults, and abstractions to support the at least one code sample  
15           for the at least one scenario.

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17          **53.**     The method as recited in claim 49, further comprising:  
18           refining the at least one code sample according to the at least one derived  
19           aggregate component; and  
20           evaluating the refined at least one code sample with regard to simplicity;  
21           and  
22           repeating the deriving if the refined at least one code sample fails to be  
23           sufficiently simple in the evaluating.

1           **54.**    The method as recited in claim 49, wherein the determining  
2 comprises:

3                   determining additional requirements with respect to the at least one  
4 scenario, wherein the additional requirements include additional scenarios,  
5 additional usages, and additional interactions with other component types.  
6

7           **55.**    The method as recited in claim 49, wherein the deciding comprises:  
8                   considering whether adding the additional requirements to the at  
9 least one aggregate component hinders a create-set-call usage pattern.  
10

11          **56.**    The method as recited in claim 49, wherein the defining comprises:  
12                   defining the plurality of factored types responsive to the deciding  
13 with an ideal factoring of a full set of functionality.  
14

15          **57.**    The method as recited in claim 49, wherein the defining comprises:  
16                   defining the plurality of factored types responsive to the deciding  
17 using one or more object-oriented methodologies.  
18

19          **58.**    The method as recited in claim 49, further comprising:  
20                   determining whether the at least one aggregate component is to encapsulate  
21 or expose the functionality of each factored type of the plurality of factored types.  
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1           **59.**     The method as recited in claim 49, further comprising:  
2           refining the plurality of factored types to support the at least one aggregate  
3 component and the additional requirements.  
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